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ABSTRACT

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# An Anthropological View Of Educational Communications And Technology: Beliefs And Behaviors In Research And Theory[1]

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**Abstract:** This paper examines the possibility of a Kuhnian paradigm in research and theory in educational communications and technology. First, it analyzes Kuhn's model and the attraction of this model as a viewfinder. It turns to anthropology for explanation of beliefs and behaviors. Then it takes a critical look at use of the Kuhnian paradigm metaphor in the field of educational communications and technology. The implications of an alternative research agenda are examined. This paper concludes with a discussion of the schism between researchers and practitioners in the ways they know the world.

The paradigmatic status of educational communications and technology is reviewed in this paper from a cultural anthropology perspective. Kuhn's metaphorical book on paradigms, *The Structure of Scientific Revolutions* (1970), has itself become a metaphor since its first publication in 1962. Kuhn used citation analysis, a historical method, for building his paradigm model of how empirical thought develops in physics and astronomy. Empiricists from other disciplines borrow his model but they do not apply his methodology. Using rational tools they would not normally allow in their work due to lack of empirical rigor, they describe their own fields as paradigmatic. The Kuhnian metaphorical structure has diffused from describing scientific research in physics and astronomy. It is applied to almost any perceived state or desired change, from improvements in computer operating systems to research and theory in educational communications and technology.

## Kuhn's Model

Kuhn's *The Structure of Scientific Revolutions* (1970) opposed Popper's principle of falsifiability (Popper, 1934/1968). Described in *The Logic of Scientific Discovery*, falsification had been accepted for three decades. Popper asserted the superiority of empirical observation over scientific theories accepted on the basis of agreement between authorities. In the Popperian tradition, competition between research strategies is thought advantageous to science. The credibility of steadystate knowledge rests not on dogma but on refinement and replacement by more powerful theories and closer approximations of truth. Kuhn questioned what had become the textbook explanation of continual, logical progress and created his model to explain the results of bibliographic research on the history of science.

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Kuhn's model contains three central metaphors: paradigm, anomaly and revolution (1970). The paradigm is an accepted set of rules for knowing about and conducting normal science. The anomaly is the exception that stimulates new explanations that cannot be ignored. The revolution is the emergence of a new paradigm.

Kuhn identified three normal foci of factual scientific investigation (1970, p. 25-30):

*Determination of significant fact*–Paradigmatic facts are developed for solving paradigmatic problems as a result of applying research strategies. Measurement occurs with increasingly refined apparatus and methods. Some researchers receive more recognition for developing research tools than for what they find.

*Matching facts with theory*–This comes from addressing research issues. Increasing the match between theory and nature comes from arguments and/or factfinding demonstrations rooted in the real world. Kuhn stated: "The existence of the paradigm sets the
problem to be solved; often the paradigm theory is implicated directly in the design of apparatus able to solve the problem." (1970, p. 27).

*Articulating theory*–A paradigm is articulated by looking for universal constraints, quantitative laws and experiments, in a more qualitative sense, that elucidate a phenomenon and relieve ambiguous interpretations.

## Kuhn's Model In Action

This model with its triple foci is not Popperian falsification (Kuhn, 1970, p. 77-80). The historical study of scientific development shows that new basic theories appear in the short revolutionary period of extraordinary science and new paradigms are incommensurable with previous paradigms. In the long periods of normal science, the reigning paradigm restricts researchers to puzzle solving science in which assumptions are accepted and not questioned.

Kuhn (1970) further challenged modern rationality by doubting the neutrality of investigators and suggested the importance of considering sociological and individual psychological aspects. He situated the longterm search for objective truths within the reality of the everyday world: "Lifelong resistance, particularly from those whose productive careers have committed them to an older tradition of normal science, is not a violation of scientific standards but an index to the nature of scientific research itself." (p. 151).

Kuhn's relativistic approach led to debates with other philosophers and historians of science including Popper, who defended the neutrality of scientists, Lakatos, who described rules for sequential theories in scientific research programs, and Feyerabend, who welcomed subjectivity and accepted mysticism (Lakatos & Musgrave, 1970). The choice of empiricism as a way of knowing drew doubts because it is empirically unprovable. Dependency on gathering data through observation became understood as a bias. Science in action claims objectivity but fails any test of neutrality. Debate with Lakatos chased empiricism into a corner as a sociopolitical business with sociopolitical aims when Kuhn demonstrated the importance of consensus in the scientific community for determining facts.

Kuhn's bibliographic analyses increased in particularity over time because each revolution requires a unique explanation. His original metaphors did not fit all situations. He discovered differing paradigms for chemistry and physics that described helium either as an atom or as a molecule (1970, p. 50-51). Kuhn drew parallels from science to art, from theories to painting styles (1977, p. 340-351). With the refinement of specificity, Kuhn's model was reduced in scale from paradigms in conflict to theories in conflict. This admitted lack of generality, partly in response to close examinations of the issues, resulted in severe attack. Stegmüller's book *The Structure and Dynamics of Theories* finds "Kuhnianism" not only relativistic but irrational (1976, p. 241-246).

Kuhn had constructed a usable metaphor. The model became popular as scholars in many areas borrowed his structure regardless of its relativistic base (belief in social perspective as reality). It has been applied uncritically by realists (believers in objective reality) and instrumentalists (believers in measurement as reality). Kuhn's model has become dominant. Casti wrote, "With Kuhn we have come to the end of the line as far as contemporary views on the way science operates both to form and to validate its view of the world." (1989. p. 45).

*Paradigm* has lost its revolutionary fire. It may mean no more than *Weltanschauung* as a metaphysical, epistemological and methodological perspective of the times. As the author of a classic work, Kuhn has endured the fate of classic authors because his model has been more often cited than read (Adams & Searle, 1986, p. 381).

Kuhn's Model And Social Science

In examining the relationship of Kuhn to the field of educational communications and technology, it is first necessary to review Kuhn's influence on the social sciences, the source of education theories and research methods. The acknowledgement of a paradigm is socially desirable in any discipline as a sign of intellectual adulthood. Just as early psychological researchers had "physics envy" (Gould, 1981, p. 262-263, some social sciences have been the subject of debates over whether they are really scientific or not (Kuhn, 1970, p. 160). Psychologists claim that understanding paradigm shifts in their field is central to understanding cognitive psychology (Lachman, Lachman & Butterfield, 1979). There was a Kuhnian diffusion of ideas in linguistics:

> In accordance with Thomas Kuhn's (1970) description of paradigm changes in the sciences, the Chomsky point of view took over, not by convincing the previous generation it had been in error, but by winning the allegiance of the most gifted students of the succeeding generation. (Gardner, 1986, p. 209).

Similarly, parapsychologists are attracted by the orthodoxy of Kuhnian metaphors (Barnes, 1983, p. 90-93; Radner & Radner, 1982, p. 62-67). However, Kuhn had ventured "...it remains an open question what parts of social science have yet acquired such paradigms at all. History suggests that the road to a firm research consensus is extraordinarily arduous." (1970, p. 15).

Despite Kuhn avoiding extrapolation of his ideas to the social sciences, the central argument that more is happening in science than an academic competition of ideas caused Barnes to write on *T.S. Kuhn and the Social Sciences* (1983). Barnes describes the dangers of Whig history, of viewing the past as a reflection of the present, and of writing textbooks that present only facts that support current understandings. He writes that Kuhn's ideas have become progressively more conformist, conservative and supportive of the scientific establishment. Barnes also uses the phrase "intellectual laziness" (p. 120) to show that he does not endorse the dogmatic acceptance of Kuhn's model as an after the fact explanation in sociology, economics or psychology.

Kuhn (1970) had cautioned:

> The members of all scientific communities, including the schools of the "pre-paradigm" period, share the sorts of elements which I have collectively labeled 'a paradigm.' What changes with the transition to maturity is not the presence of a paradigm but rather its nature. Only after the change is normal puzzle-solving research possible. (p. 179).

Barnes' (1983) reflections on Kuhn (1970) illustrate the seductiveness of Kuhn's model. No area wants to be regarded as preparadigmatic when having a paradigm appears to be a measure of social standing. The widespread use of Kuhn's model causes a subtle dislocation. There is a self contradiction in employing it to assert professional status. Mitchell, an English professor, identified the essence of this interdisciplinary borrowing:

> We can always tell which of two crafts outranks the other by looking at its lexicon. Jargon only runs downhill. You will notice that although educators have borrowed "input" from the computer people, the computer people have felt no need to borrow "behavioral objectives" or "preassessment" from the educators. (Mitchell, 1979, p. 106).

## Cultural Evolution

Kuhn, the historian of science, describes the scientific way of knowing but does not provide a sufficient explanation of the sociopolitical forces driving that way of knowing. Cultural anthropologists, however, specialize in that type of problem. They describe what people do and what they say they do and construct explanations for beliefs and how they change. Harris, in particular, has proposed a theory of cultural evolution that accounts for how beliefs and behaviors are formed in response to environmental pressures (1968, 1974, 1977, 1980, 1989). This theory is known as cultural materialism. Harris' theory explains why beliefs and behaviors are shaped by fundamental issues such as food supply and population growth (1985). He has also extrapolated this theory to hyperindustrial life (1987).

Harris gives the basic principle of cultural materialism with these words: "The etic behavioral modes of production and reproduction probabilistically determine the etic behavioral domestic and political economy, which in turn probabilistically determine the behavioral and mental emic superstructures." (1980, p. 55-56).

Etic operations are independently verifiable: "The test of the adequacy of etic accounts is simply their ability to generate scientifically productive

theories about the causes of sociocultural differences and similarities." (Harris, 1980, p. 32).

In contrast, emic operations give native informants absolute status in determining the reality, meaningfulness or appropriateness of analyses. These etic and emic distinctions are not mere synonyms for behavioral and mental. They combine into "four objective operationally definable domains in the sociocultural field of inquiry" (Harris, 1980, p. 38).

An example comes from Harris' fieldwork with farmers in Kerala, on the western side of the Indian peninsula (1980, p. 32-40). From the etic view the feeding of male calves is restricted so the gender ratios of the cattle are adjusted through starvation. This suits the local ecological and economic conditions for farming. From the emic view, no farmer would violate the Hindu prohibition against slaughter. The Kerala farmers say that male cattle are weaker, sicker and inherently eat less than female cattle.

The paradoxical relationship between etic and emic views is testable by a cultural comparison. Hindu farmers in parts of India with different local ecological and economic conditions, such as the inland states of the north, value the traction capabilities of cattle. In Uttar Pradesh, the seat of Hindu religion and culture, the mortality rate of cows is significantly higher than that of oxen. Besides slowly starving the female calves, unwanted animals are sold to Moslem traders. Again, the death of the animals because of gender appears intentional (Harris, 1980; Harris, 1985).

This knowledge can be applied to the culture of educational communications and technology research and theory. From the cultural materialist viewpoint the behavioral and mental emics of a culture are determined by the etic forces. The emic projections or reconstructions become beliefs. Harris lists the mental and emic components as conscious and unconscious cognitive goals, categories, rules, plans, values, philosophies and beliefs about behavior (1980, p. 54). Scholarly beliefs are also emic representations and there is a tendency to favor low grade emic stories over high grade etic information (Price, 1980). Travers describes similar myth building behavior about research in education (1987). The next section of this paper looks at the emic superstructure of educational communications and technology.

## The Emic Functions Of A Cognitive Paradigm

The claim to a cognitive paradigm in educational communications and technology (Clark & Salomon, 1986; Clark & Sugrue, 1988; Heinich, 1970; Winn, 1989) can be read as a social text. Harris' theory suggests that belief in the cognitive paradigm performs a social function. Like the boost in agricultural production from a Kwakiutl chief redistributing wealth at a potlatch (Harris, 1974), it encourages cooperation in the joint productive effort. Having a paradigm is an indication of being established. The transition from preparadigm state to postparadigm state is widely perceived as the passage of puberty for any discipline and from the viewpoint of cultural evolution, claiming a paradigm has adaptive value. It helps people obtain and maintain employment. When prospective colleagues say they are believers, they increase their chances of survival in the job market. Publishing

manuscripts that look outside of cognition in examining what the field does and why it is done, causes schisms and these reduce the centralized power. Conflict is discouraged because it decreases material growth.

To claim a cognitive paradigm impresses other big men[2] such as granting agencies. It reassures school district superintendents and corporate directors of instructional systems that learning is knowable and predictable. Everything appears under control and the scholars who support a cognitive paradigm promise to bend their research efforts to everyone's benefit.

Belief in the cognitive paradigm in educational communications and technology may exist without paradigmatic consensus. Instead of a paradigm, Kuhn's structure may offer another explanation which fits the field better. In Kuhn's model, preparadigmatic research is characterized by the atheoretical factfinding characteristic of prescientific times (1970, p. 15-16). Explanations of phenomena are inadequate. Data are too dense for decoding. Details are missed which are later considered important. In preparadigmatic research, technology is the name given to solving practical problems systematically. Technology parents science.

Understanding The Transmission Of Culture

From the cultural materialist point of view, individuals and groups in the field can still use their reason to choose what they want to believe and what they want to do. Although lacking evidence for this occurring earlier, Harris suggests that deliberate choices may be the only hope for the planet in the face of the ecological emergency (1987, p. 181-183). Researchers in the field could search to make the questions they ask more meaningful, to make their results more useful and for new methodologies and theories. From this viewpoint, sociocultural research represents a strength of educational communications and technology's position as an applied field. Scholars investigating this dimension would recognize more is at stake in educational communications and technology than achievement. Their work would be closer to practice. Driven by sociocultural research issues, their investigations would draw from the theories and methods of the social sciences and the humanities. Some would write in what Husen (1988) identifies as humanism, educations' other way of knowing, as opposed to neopositivism/logical empiricism. These scholars would be concerned about critically understanding cultural reproduction.

Nichols, for example, believes the field might turn from the mechanical study of achievement and select the direction of Habermasian morality (Habermas, 1984; Habermas, 1987; Wells, 1986):

> Education should function, via communicative action, to help us competently reach understanding with one another (the cultural function), fulfill appropriate societal norms (the social function), and develop our personalities (the socialization function), and in the process, learners become involved with objective, practical and emancipatory forms of knowledge. (Nichols, 1989, p. 351).

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[2] This is an anthropological term denoting leaders who work extremely hard at motivating their followers to be productive. See, for example, Harris (1989, p. 359).

## The Schism Between Researchers And Practitioners

The beliefs and behaviors of educational communications and technology are rooted in the practice of using and producing educational media but researchers focus on one set of activities and practitioners focus on another set of activities. Researchers investigate to write scholarly research reports but educational cinematographers investigate to create films and videos. Classroom teachers, school media coordinators and instructional systems developers select images to convey the world to learners. They know the field is effective because educational media employ rhetoric and the way of saying something changes what is said. Their productions are lyric, dramatic and epic. Even computer screens are alive with metaphors.

Adams' *Philosophy of the Literary Symbolic* (1983) confronts the tension between the literary and the scientific ways of knowing: "The war between poetry and philosophy has extended from before Plato's time into our own." (p. 389). These words also apply to educational communications and technology. More than a paradigm, debates between researchers and between researchers and practitioners ensure conscious decisions. These are necessary to defeat the material pressures on beliefs. More than a paradigm, the field needs this conflict between the philosophy of research and the poetry of practice.

As an applied field, the Kuhnian paradigm of revolutionary process does not fit educational communications and technology and neither does the falsificationist myth of orderly progress. The description of the preparadigmatic state fits best. There are material pressures for *claiming* a cognitive paradigm. That claim is an emic fact, whether it is empirically true or not.

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